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NOTES ON THE NARROW-MOUTHED TOADS (*ENGYSTOMA*) AND THE DESCRIPTION OF A NEW SPECIES FROM SOUTHEASTERN TEXAS.

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In 1859 Girard described a narrow-mouthed toad from Rio Seco, Texas, under the name of *Engystoma texense*. Cope and his contemporaries failed to recognize the animal as distinct from *E. carolinense* Holbrook and until quite recently it has been confused with that species.

In 1906 Miss Mary Dickerson* redescribed *E. texense* from a series of living examples from Brownsville and called attention to the fact that it is a very distinct and easily recognizable species.

The present writer was at first inclined to be a little doubtful of the status of *Engystoma texense*, and, in order to fully satisfy himself that the characters which were supposed to distinguish the two species were constant, made an effort to accumulate a sufficient number of examples of *Engystoma* from different localities, that the question might be settled beyond a doubt.

As a result, a large series from eight States has been brought together. Acknowledgments are due to Dr. Leonhard Stejneger, United States National Museum, for the loan of a series of *E. carolinense* from Florida, Georgia and North Carolina and for notes on Texas specimens of the genus; to Miss Mary Dickerson, American Museum of Natural History, for the loan of two examples of *E. texense* from Brownsville, Texas; to Mr. Julius Hurter of St. Louis, Mo., for examples of *E. carolinense* from Alabama, Louisiana, Missouri and Paris, Texas; and to Hon.

* The Frog Book, New York, p. 168.

J. D. Mitchell of Victoria, Texas, for a series of *E. texense* and the type specimens of a new species herein described as *Engystoma areolata*.

In addition to these specimens, the writer has had access to the material in the herpetological collection of Baylor University, consisting of examples of *E. carolinense* from Arkansas and Missouri and of *E. texense* from several Texan localities. After a critical study of the material from all of the sources above mentioned, he has reached the following conclusions:

First. That the narrow-mouthed toad usually reported from Texas is not *Engystoma carolinense* but *E. texense* which is a very distinct species.

Second. That the *Engystoma carolinense* of Holbrook is exceedingly rare in Texas. The only typical specimen examined was from Paris, Lamar County, in the extreme northeastern section of the State.

Third. That a small form with unusually pustulate upper surfaces, peculiar coloration and short hind feet, from southeastern Texas, is worthy of recognition as a distinct species (*Engystoma areolata* Strecker).

Curiously enough, Dr. Stejneger had already noticed the peculiar character of some specimens from Victoria and Calhoun Counties, Texas, and in writing to me, gave me the benefit of his data. In southeastern Texas the new species occurs in localities inhabited by the widely distributed *Engystoma texense*, but in central Texas where the latter species is the prevailing or, as I am now fully satisfied, the only form of narrow-mouthed toad, no examples have been found that are even an approach to *E. areolata*.

Engystoma carolinense Holbrook.

This is the largest of the three forms here considered and the most widely distributed. Examples have been examined from Raleigh, North Carolina; Columbus, Georgia; Milton and Little Sarasota Bay, Florida; Mobile, Alabama; St. Tammany County, Louisiana; Hot Springs, Arkansas; Cliff Cave and Butler County, Missouri; and Paris, Texas. It has also been reported from Johnston and Wayne Counties, North Carolina;† Riceborough, Georgia; Clarcona, Lake Jessup and Micanopy, Florida; Greenway, Arkansas; Calcasieu Parish, Louisiana; New Madrid, Missouri, and various localities in Texas; but most of the Texan localities are open to doubt, this species probably being confused with *E. texense*.

† C. S. Brimley, Journal Elisha Mitchell Sci. Soc., Dec. 1907, p. 159.

Some of the larger (female) specimens of this species attain a total length of 38 mm. The average length of twenty adults (10 males and 10 females) is about 30 mm. The body is stout, the greatest width of a finely preserved example 37 mm. in length being 21 mm. The upper surfaces are black, brown or dark gray. The markings are usually in the form of two oblique bands (black or brown) one on each side, extending from the eyes to the posterior part of the body. Under surfaces gray or light brown, speckled with white or light yellow. The head is pointed, but not so conspicuously as in the slender-bodied *texense*. Canthus rostralis not prominent. The limbs are longer and heavier than those of the other two species. The skin is either entirely smooth or very slightly pustular on the posterior portion of the body. The inner sole tubercle is larger than in examples of *texense* of approximately the same size.

The single example from Paris, Texas (No. 271, Hurter Coll.), is one of the largest examined and one of the most typical. The under surfaces are darker than usual and the blotches are unusually distinct. The inner sole tubercle is larger than in examples of the same size from Florida, Missouri, and Alabama.

An example from Cliff Cave, St. Louis County, Missouri (No. 111, Hurter Coll.), is the lightest colored specimen in the series but the markings are of the same type as in more eastern examples (North Carolina and Georgia). Three large specimens from Butler County, Missouri (Baylor University Collection), present a rather peculiar color pattern. The usual oblique bands are present but the dorsal area is heavily mottled with darker shades.

Examples from Mobile, Alabama (No. 2763, Hurter Coll.), and St. Tammany County, Louisiana (No. 957, Hurter Coll.), are unusually dark. The Louisiana specimen, while less than half grown, has the inner sole tubercle well developed.

In two specimens from Raleigh, North Carolina (U. S. National Museum Collection), the color pattern is unusually distinct. Nearly all of the specimens from Florida and Georgia are old and the color pattern is almost entirely obliterated from long immersion in spirits.

As a whole, the series presents very little variation excepting in color. The majority of the specimens are large and smooth-skinned, with the color of the under surfaces very distinct. The specimens from North Carolina are the most pustular but the minute pustules are confined to the sides and posterior extremities. The Missouri, Alabama and Texas specimens are the smoothest-skinned examples in the series. The inner sole tubercle is better developed in the more western examples.

Engystoma texense Girard.

This is the prevailing form of *Engystoma* in central and southern Texas. I have examined authentic specimens from Brownsville (Am. Mus. Nat. Hist. Coll.), Victoria, Refugio, Waco, Laguna and Calvert. The examples from most of these localities were formerly referred by me to *E. carolinense*, but at the time I had only a few half-grown specimens of that

species from Hot Springs, Arkansas, for comparison. *E. texense* is also recorded from Rio Seco (type locality) and San Diego (Dickerson).

Cope recorded *E. carolinense* from Dallas, Houston and San Antonio, but these records were doubtless based on specimens of the species now under consideration. Miss Dickerson mentions the same species from Hitchcock, and, unless the specimen referred to belongs to the new species, *E. areolata*, the record carries the range of the eastern species much further south in the coast region of Texas than the localities represented in the present lot of material would indicate.

Description.—Size small, total length from 22 to 29 mm. Greatest width of body usually less than half the length from muzzle to vent. Color in alcohol (specimens comparatively fresh) gray, greenish or light brown. Markings consist of a few scattered spots. Under surfaces, white. In a very few examples, the throat is slightly spotted with a shade of gray.

The skin of the underside of the body is very thin, the outlines of the internal organs showing through. The body is slender, skin of upper surfaces very smooth. Muzzle pointed. Canthus rostralis unusually prominent. Inner sole tubercle small. Hind limbs short.

It differs from *E. carolinense* in smaller size, lighter colors, entirely different color pattern, unspotted underparts, slender body, more uniformly smooth skin and much shorter limbs.

Several examples from Laguna and Waco, Texas (Baylor University Collection), at a first glance appear rough-skinned, but this is a defect in the preservation and is caused by a general shrinkage of the skin. These specimens are darker than usual, but they otherwise agree with Brownsville examples in all important characters. In the general color of the upper surface, specimens of *E. texense* vary considerably, but in only a very small per cent of the material examined do the markings show any indications of forming any definite pattern. The spots are small and usually very widely scattered. In the majority of cases there are more spots on one side than on the other. Unmarked examples are not rare. In a very few examples, the markings of the hind limbs show an approach to the formation of regular bands as in *E. carolinense*. The specimen figured in Miss Dickerson's "Frog Book" (Plate LX. Fig. 5) has heavier markings than any specimen now in my possession. Another Brownsville example has less than a dozen small scattered black spots.

Engystoma areolata sp. nov.

Type No. 501, Collection of J. D. Mitchell, Victoria, Texas, from Guadalupe River bottom, Victoria County, Texas, January, 1909. Cotype in Baylor University Museum (No. 4086).

Description.—Size small (about equal to *E. texense* Girard). Total length of type, 22 mm. Body stout, more uniform in width than *E. carolinense*. Color (in alcohol) above, light gray, with darker markings which are heaviest in the dorsal region. Style of markings might be termed "marbling" on account of their irregular outlines and light colored interspaces. Limbs heavily marked. Under surfaces, light gray with

closely placed lightish spots. Skin of back areolated, even pustular on the posterior part. Pustules very uniformly distributed. Muzzle shorter than in examples of *E. carolinense* and *E. texense* of the same size. Canthus rostralis not prominent. Hind limbs short. Hind foot unusually short. Inner sole tubercle large.

Compared with *E. carolinense* it differs in its smaller size, in the generally more regular outline of the body as viewed from above, in the shortness of the hind leg and foot and in the remarkably pustular appearance of the upper surface of the body. The inner sole tubercle is much larger than in examples of *E. carolinense* of the same size.

It resembles *E. texense* in size and in the shortness of the hind limbs but in no other characteristic.

Two specimens of *Engystoma areolata* collected with the type (No. 501*a*, Mitchell Collection, and No. 4086, Baylor University Collection) are similar in every respect excepting in color. One of these specimens has much the same color pattern but the markings are heavier and the ground color lighter. The other is rather dark and the back and upper surfaces of the limbs are marked with closely placed blotches of brownish olive. In the type a dark line extends along the muzzle from orbit to orbit and there is a small dark broad V-shaped mark between the orbits. No dark line along the sides as in *carolinense*. The data accompanying these specimens is as follows:

"Found under logs associated with examples of *Engystoma texense*, *Bufo valliceps*, *Hyla cinerea*, *Hyla squirella*, *Rana pipiens*, *Anolis carolinensis*, *Eumeces quinquelineatus*, *Leiolepisma laterale*, *Ancistrodon contortrix*, numerous species of beetles, ants and other insects." (J. D. Mitchell.)

Dr. Stejneger has given me the following notes on Texas specimens examined by him some years ago. These notes doubtless refer to *E. areolata*:

"No. 35,942 (U. S. Nat. Mus. Coll.) Victoria, Texas, J. D. Mitchell, collected in 1897. Skin of back areolated.

"Four specimens (Victoria High School Collection, No. 52), collected by Mitchell under timber in Spring Marsh, Well Camp, Alligator Head, Calhoun County, Texas, March, 1902, also have the back areolated, the posterior part even pustular. Metatarsal tubercle rather large and hind feet short."

Notes on the Habits of the Narrow-Mouthed Toads.

On account of their strictly nocturnal habits, very little is known of the life histories of these diminutive toads, but the following data may shed some light on their habitat relations:

Engystoma carolinense.—Dr. E. Loennberg* states that in Florida he "found this peculiar little animal under old logs, dry palm leaves and such things near lakes and in moist places in Orange County, for instance,

* Proc. U. S. National Museum, 1894, Vol. 17, page 338.

in the pineland at Clarcona and the hummocks bordering Lake Jessup." Mr. C. S. Brimley says that at Raleigh, N. C., the narrow-mouthed toad breeds from May to August. "I can get them from May on in warm, damp weather." This species is confined principally to the humid division of the Lower Austral Life Zone. The other two species are inhabitants of the dryer portions of the same zone although the range of *texense* extends into the humid division.

Engystoma texense.—The following interesting extract is from a letter from J. D. Mitchell dated March 8, 1909:

"Here is a sight I witnessed on the 20th of February, in the Guadalupe River bottom, Victoria County: Under a log, in a depression 12 x 16 inches and 3 inches deep were two *Ancistrodon contortrix* (adults), one *Rana pipiens*, one *Hyla squirella*, one *Hyla cinerea*, two *Engystoma*, three *Bufo valliceps*, two *Eumeces quinquelineatus*, one *Leiolepisma laterale* and between 500 and 1,000 crickets about one-third grown. One toad was within the folds of one of the snakes and none of the toads, frogs or lizards were over eight inches from the snakes and the crickets covered the whole business. Verily, cold weather, like politics, makes strange bed-fellows. The crickets hopped and scattered, but all of the others remained quiet in their winter forms until handled. The stomachs of the moccasins were perfectly empty."

In December, 1903, at Laguna, Falls County, the writer found a number of examples of *Engystoma texense* under logs lying along the edge of a lagoon, in button-willow thickets. Under these logs were also specimens of *Rana pipiens*, *Hyla cinerea*, and *Ambystoma microstomum*. In a strip of oak woods on the east side of the Brazos River, not far from Waco, narrow-mouthed toads are rather common during the fall and spring months. They are usually found under logs and dead stumps that are deeply imbedded in the ground. From two to four examples are usually found in the same place.

On May 20, 1897, I found great numbers breeding in company with *Chorophilus triseriatus* Wied and *Bufo debilis* Girard, in water-filled sinks on the mesquite prairie about two miles west of the city of Waco. During the spring rains the water-filled ditches along the railroad tracks in East Waco are much frequented by these toads. Here, at night, their sharp, buzzing notes are interspersed with the louder cries of *Scaphiopus couchii* and *Bufo debilis*, forming a rather unmusical chorus.